REMARKS

The Examiner has rejected claim 1 as being unpatentable over Okamoto in view of Raholijaona et al, on the grounds that Okamoto discloses a choke coil comprising coils wound around and a toroidal magnetic core; a base plate/connecting plate located at one side of the core/coil; and a protection plate located on an opposite side of the base plate, whereas Raholijaona discloses a method of manufacturing a core on a toroidal magnetic circuit comprising slipping on the preformed tore-shaped coil over the magnetic core. It is further opined that the motivation to combine Raholijaona with Okamoto is to enable the use of wires with thinner varnish coating (grade 1) because of the reduced torsion in Raholijaona.

Applicant has amended claim 1 to better distinguish the invention over the prior art.

Applicant is of the opinion that the skilled artisan would not find it obvious to combine Okamoto with Raholijaona for the reasons that follow, since Okamoto teaches away from the claimed invention and would discourage the skilled artisan from considering the teachings of Raholijaona.

It is well-known in common mode choke coils to provide a toroidal magnetic core that is continuous, in other words, which does not have an air-gap as in the case of the magnetic core according to the present invention. In the present invention, the air-gap is used to position a magnetic field sensor therein in order to measure the magnetic field circulating in the magnetic circuit. In a choke coil, the toroidal magnetic core is used to couple the magnetic fields generated by the two magnetic coils, which generate magnetic fields in opposed directions, but of similar magnitude in order to cancel the common mode effects. The coils are connected in series to an electrical conductor (*i.e.* the opposite poles of the conductor in question) in order to cancel out the common mode noise in the conductor. The wire of the coils must therefore be able to carry the current intensity of the electrical line, which generally means that the conductor wires are not very

fine, but one generally of relatively large diameter (compared to wires of a secondary coil of an electrical current sensor). Moreover, a large number of turns creates a very high inductance that may cause excessive heating (considering that the coils are connected in series to the electrical lines), such that the number of turns in common mode coils are generally not very high, as compared to the secondary coil of an electrical current sensor. A thin varnish layer is only desirable or of importance where very thin wires are used and a very compact coil should be produced. This is, however, not sought after in choke coils, since the coil wires carry the primary current and are therefore of relatively large diameter and have relatively few turns around the toroidal magnetic circuit. In Okamoto, therefore, the skilled person does not at all seek to replace grade two wires with grade one wires. More importantly, however, in order to use the teachings of Raholijaona in Okamoto, the skilled artisan would have to split the toroidal core of Okamoto in order to insert the coil according to the teachings in Raholijaona. In order to have the most efficient coupling between the two coils of Okamoto however, the skilled artisan specifically seeks to reduce leakage flux, which is one of the main aims of Okamoto. By splitting the toroidal magnetic circuit, there would be an increase in leakage flux, which would therefore go against the teachings of Okamoto. A skilled artisan would thus not only have no motivation to combine Raholijaona with Okamoto, but would in fact be taught in the opposite direction. Applicant further maintains that, even if the skilled artisan were to combine Raholijaona with Okamoto, which is not admitted, he/she would not arrive at the invention according to claim 1, since Okamoto does not disclose both a connector and an end plate arranged proximate respective first and second ends of the magnetic coil. The protection plate identified by the Examiner serves to carry a magnetic shield strip in Okamoto and in no way it is mounted at an end of either of the two separate coils shown in Okamoto. The protection plate is also not mounted on the toroidal magnetic core with a central cavity in which the magnetic coils are inserted as required by claim 1. The protection plate in

Okamoto is mounted around the magnetic circuit and magnetic coil. In this regard, it should be noted that the Examiner has not identified all the claimed features in Okamoto and has merely stated that the protection plate is "located on an opposite side of the base plate."

As concerns claim 9, this claim stipulates that the connector housing comprises a guide portion around which a portion of the coil is wound. The Examiner merely states that Okamoto illustrates that the base plate/connector plate contains holes through which ends of the wire/coil are positioned, this teaching however does not correspond to the language of claim 9. Okamoto does not disclose a connector with a guide portion around which a portion of the coil is wound. This feature allows the connector to be centrally positioned within the coil and protect the coil during insertion thereof onto the toroidal core. Not only does the base plate of Okamoto not have this function at all and neither the feature of claim 9 but moreover, since the magnetic circuit is not split, would have no reason to have such feature.

As concerns claims 2, 3 and 8, the teachings of these claims are not disclosed in the prior art, for the reasons discussed above. Moreover, the skilled artisan would not consider the teachings of Skinner, which relate to an ignition coil that is in a completely different field from a current sensor. More importantly, however, the short section of conical surface 60 of the ignition coil only concerns a very small initial part of the coil, whereby the principal length of the coil is completely cylindrical. Also, the coil is not inserted, not even insertable, on the cylindrical support 22, but rather wound thereon. It should be further noted that the angle of this very short inner section is significantly greater (see Figures 2 and 3) than the angle represented by a range ten α between 0.001 and 0.01. An angle as strong as that shown in Skinner would in fact completely discourage the skilled artisan from considering providing a conical inner surface of the coil in the present invention where the coil must be slipped on an essentially toroidal magnetic core which has a circular cross-section. The value of the angle shown in Skinner is thus so far off the range claimed

in claims 2 and 3 of the present invention, that a skilled artisan, considering Skinner, would not be able to find an optimal working range as set forth in the claim. On the contrary, the large angle shown in Skinner would in fact completely mislead the skilled artisan.

As concerns the claims rejected on the basis of double patenting, Applicant agrees to file a terminal disclaimer, which is enclosed.

Respectfully submitted,

By: _____

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